UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 12 1994

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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: ID. No. 067673-EUP-R, Experimental Use Permit for Carbendazim

Tox. Chem. No.: 079C
DP Barcode #: D202578
Record No. : S464237

FROM: Melba S. Morrow, D.V.M. MSM 7/26/94
Review Section II, Toxicology Branch I
Health Effects Division (H7509C)

TO: Carl Grable, PM Team 21
Registration Division (H7505C)

THRU: Joycelyn E. Stewart, Ph.D. JES 7/27/94
Head, Section II
Toxicology Branch I
Health Effects Division (H7509C) KB 8/1/94

CONCLUSIONS:

Based on the information provided Toxicology Branch I has no objection to the issuance of an EUP for the use of carbendazim in paints and plasters. The EUP requests authorization to use 600 pounds each of Mergal S 89 paste, Mergal S 89R paste, Mergal S 90 and Mergal S 90R. Sixty pounds of Mergal BCM is requested based on the amount that will be mixed in paints and plasters.

Toxicology Branch has completed the review of data submitted to support an EUP for carbendazim. We have the following comments in reference to the data:

- 81-1 (MRID 431296-08) Acute Oral Toxicity in rats, LD50 > 5050mg/kg, Tox category IV, Classification: Acceptable.

- 81-2 (MRID 431296-09) Acute Dermal Toxicity Study in rabbits, dermal LD50 > 2020 mg/kg, Tox Category IV, Classification: Acceptable.

- 81-3 (MRID 431296-10) Acute Inhalation Toxicity Study in Rats, LC50 > 5.72, Tox. Category IV,

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Classification: Acceptable.

- 81-4 (MRID 431296-11) Primary Eye Irritation Study in Rabbits, mild ocular irritation which subsided 48 hours post-instillation, Tox. Category III, Classification: Acceptable.

- 81-5 (MRID 431296-12) Primary Dermal Irritation Study in Rabbits, mild dermal irritation at the 1 hour observation interval (irritation score: 0.3), Tox Category III, Classification: Acceptable.

- 81-6 (MRID 432055-03) Dermal Sensitization Study in Guinea Pigs, non-sensitizing when tested using the Buehler technique. Classification: Acceptable.

- 84-2(a) (MRID 432055-04) Ames Test. Negative for gene mutation in bacterial cell cultures, with and without activation at doses up to 5,000 ug/plate. Classification: Acceptable.

- 84-2(b) (MRID 432055-05) Chromosome Aberration Test. Negative for chromosome damage in Chinese hamster ovary cells, with and without activation up to cytotoxic and precipitating doses from 300 to 600 ug/ml. Classification: Acceptable.

- 84-4 (MRID 432055-06) Unscheduled DNA Synthesis. Negative for UDS in human cells with and without activation up to cytotoxic/precipitating doses (30 to 100 ug/ml). Classification: Acceptable.

Copies of the DERs are provided for your reference. Please refer to the memo of 7/22/94 from I. Mauer to M. Morrow which contains the conclusions and DERs for the mutagenicity studies.

BACKGROUND:

The sponsor has requested a Experimental Use Permit to evaluate and compare the efficacy of several different formulations containing Carbendazim. Th test formulations will be used in ten different states and th will be used against fungi, algae and natural microflora that oul housepaints and plasters. Formulations to be tested wh ch contain Carbendazim are:

Mergal S 0
Mergal S CR
Mergal 9 Paste
Mergal 9R Paste
Mergal

The above products will be mulated into paints and plasters. Mergal BCM will be added to int at a rate of 2 to 5 pounds per

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1000 pounds of paint. This same product will be added to plaster at a rate of 0.2 to 1.0 pounds per 1000 pounds of plaster. All other products (Mergal S 90, Mergal S 90R, Mergal S 89 paste and Mergal S 89R Paste) will be added to paint at a rate of 10 to 20 pounds of product per 1000 pounds of paint. For plaster, these products will be mixed at a rate of 1 to 3 pounds per 1000 pounds of plaster.

Experimental studies will be conducted in 10 states and the testing period will run from April 1, 1994 to March 31, 1996. Non-replicated trials consisting of 6 houses will be conducted on 60 planned sites in 8 southern and 2 northern states. A total of 2.75 acres is proposed for each state. Applications will be made in the spring and summer, primarily, with fall applications being acceptable for houses in the southern states. Paint applications will be made to new structures and to houses previously painted.

Proposed labelling has been provided which contains information on the storage and disposal of the pesticide and the product container.

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Reviewed by: Melba S. Morrow, D.V.M. MSM 1/21/94
Section II, Tox. Branch I (H7509C)
Secondary Reviewer: Joycelyn E. Stewart, Ph.D. JES 1/21/94
Section II, Tox. Branch I (H7509C)

DATA EVALUATION REPORT

STUDY TYPE: Acute Oral Toxicity Study

GUIDELINE #: 81-1

TOX. CHEM. #: 079C

MRID #: 431296-08

TEST MATERIAL: Carbendazim, 25% w/v

SYNONYMS: BCM, LX1132-01

STUDY NUMBERS: 6274-89

SPONSOR: Riedel de Haen
Seelze 1, Germany

TESTING FACILITY: Stillmeadow, Inc.
Sugar Land, Texas

TITLE OF REPORT: Acute Oral toxicity Study in rats

AUTHORS: Janice Kuhn, Ph.D.

REPORT ISSUED: August 8, 1989

CONCLUSIONS: Based on the results of this study, the oral LD50 for Carbendazim (25%) was > 5050 mg/kg when administered to Sprague Dawley rats.

CLASSIFICATION: Acceptable
TOX. CATEGORY: IV

MATERIALS: The test material was carbendazim, 25% a.i. in a 2% w/v aqueous carboxymethyl cellulose and the test animals were 5 male and 5 female young adult HSD Sprague Dawley rats. Males weighed from 272 to 337 grams and females weighed from 179 to 193 grams.

METHODS: Animals were housed 1 to 3 per cage and food and water were provided ad libitum, except during the 16 hours prior to the administration of the test material. A single dose of 5050 mg/kg (20.2 ml/kg) of a 25% concentration of carbendazim was administered by intubation. Animals were observed for mortality and toxicity 3 times on the day of dosing and once daily thereafter. Body weights were recorded prior to dosing and on

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days 7 and 14 post-dosing. The study was terminated on day 14 and a gross necropsy examination was performed on each animal.

QUALITY ASSURANCE: Statements of Quality Assurance and compliance with Good Laboratory Practices were included in the submission.

RESULTS: No deaths were reported during the course of the study, no gross abnormalities reported at necropsy and piloerection was the only clinical observation reported (males, only, 5/5). There were no testment related changes in body weight and the ccmpound had no effect on body weight gain.

DISCUSSION: Based on the results of this oral toxicity study, Carbendazim (25%) meets the criteria for Tox category IV. The study is acceptable and satisfies the requirement for an acute oral toxicity study, in accordance with section 81-1 of the Subdivision F Guidelines. This study was conducted at the limit dose for an acute oral toxicity study.

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Reviewed by: Melba G. Morrow, D.V.M. 7/12/94
Section II, Tox. Branch I (H7509C)
Secondary Reviewer: Joycelyn E. Stewart, Ph.D. 7/21/94
Section II, Tox. Branch I (H7509C)

DATA EVALUATION REPORT

STUDY TYPE: Acute Inhalation Toxicity Study

GUIDELINE #: 81-3

TOX. CHEM. #: 079C

MRID #: 431296-10

TEST MATERIAL: Carbendazim Technical

SYNONYMS: BCM, LX1132-01

STUDY NUMBERS: 6278-89

SPONSOR: Riedel de Haen
Seelze 1, Germany

TESTING FACILITY: Stillmeadow, Inc.
Sugar Land, Texas

TITLE OF REPORT: Acute Inhalation Toxicity Study in Rats

AUTHORS: Mark Holbest

REPORT ISSUED: August 25, 1989

CONCLUSIONS: Based on the results of this study, the LC50 of carbendazim was > 5.72 mg/L when administered to Harlan Sprague Dawley rats for 4 hours as an undiluted aerosol.

CLASSIFICATION: Acceptable
TOX. CATEGORY: IV

MATERIALS: The test material was carbendazim, 99 percent a.i., and the test animals were 5 male and 5 female young adult HSD Sprague Dawley rats. Males weighed from 217 to 254 grams and females weighed from 185 to 281 grams.

METHODS: Animals were housed 1 to 3 per cage and food and water were provided ad libitum, except during the 4 hour exposure period. During exposure, animals were held 1/cage and food and water were withheld. The exposure cage was a stainless steel dynamic flow inhalation chamber.

A carbendazim aerosol as generated by the use of a Gem T Trost air mill with a disc delivery system. The aerosol was diluted

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with dried and filtered air and drawn into the exposure chamber. Air flow was maintained through the use of a calibrated critical orifice and was recorded at 30 minute intervals. During exposure, the temperature in the chamber was 76° F and the relative humidity was 59%; flow rate was 39.1 L/minute.

The concentration of carbendazim in the exposure atmosphere was determined gravimetrically 2 times each hour during exposure. Nominal concentrations were determined at the end of the exposure period. The gravimetric determination was made by passing a known volume of air thru a pre-weighed filter and dividing the amount of test material deposited on the filter by the volume of air which passed through the filter. Nominal concentrations were determined by dividing the loss in weight of the test material by the total volume of air which passed through the filter.

Particle sizes were determined by using the Andersen cascade Impactor.

During the exposure period, only one observation was made at the 1/2 hour observation period. The accumulation of the test material on the chamber prevented further observations. Following exposure, animals were observed for mortality and clinical signs of toxicity on the day of dosing and once daily thereafter, for up to day 14 of the study.

Body weights were recorded prior to exposure, and on days 7 and 14. A gross necropsy was performed at study termination.

QUALITY ASSURANCE: Statements of Quality Assurance and compliance with Good Laboratory Practices were included in the submission.

RESULTS: No deaths were reported during the course of the study, and there were no gross abnormalities reported at necropsy. There were no treatment related changes in body weight and the compound had no effect on body weight gain. The LC50 for carbendazim was greater than 5.72 mg/L. Although fifty percent of the particles were less than or equal to 4.32 microns, the concentration exceeded the limit dose of 5 mg/kg. (See Table I for information on gravimetrically determined concentrations and particle size distribution).

DISCUSSION: Based on the results of this inhalation toxicity study, Carbendazim meets the criteria for Tox category IV. The study is acceptable and satisfies the requirement for an acute inhalation toxicity study, in accordance with section 81-3 of the Subdivision F Guidelines. The LC50 is greater than 5.72 mg/L, which exceeds the limit dose of 5 mg/L.

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TABLE I Concentration and Particle Size

Gravimetric Concentration

Elapsed Time (hrs)	Concentration (mg/L)
0.5	6.50
1.0	5.02
1.5	6.32
2.0	6.64
2.5	5.30
3.0	4.76
3.5	6.04
4.0	5.18
Mean	5.72

Particle size

Particle size (microns)	% particles collected
< 1.02	5
< 1 80	16
< 4.32	50
< 10.36	84
< 18.21	95

Mass median Aerodynamic Diameter = 4.324

Data taken from tables 4 and 5 of submission.

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Reviewed by: Melba S. Morrow, D.V.M. Mem 1/26/94
Section II, Tox. Branch I (H7509C)
Secondary Reviewer: Joycelyn E. Stewart, Ph.D 1/27/94
Section II, Tox. Branch I (H7509C)

DATA EVALUATION REPORT

STUDY TYPE: Dermal Sensitization

GUIDELINE #: 81-6

TOX. CHEM. #: 079C

MRID #: 432055-03

TEST MATERIAL: Hoe 017411 of ZD99 0009 (99.4%)

SYNONYMS: Carbendazim, LX1132-01, Methylbenzimidazole carbamate

STUDY NUMBERS: 87.0509

SPONSOR: Riedel-de Haen
Seelze, Germany

TESTING FACILITY: Pharma Research Toxicology and Pathology
Frankfurt, Germany

TITLE OF REPORT: Testing for Sensitizing Properties in the Pirbright- White Guinea Pigs According to the Technique of Buehler

AUTHORS: Diehl and Leist

REPORT ISSUED: April 23, 1987

CONCLUSIONS: Based on the results of this study, the test material was determined to be non-sensitizing when tested in guinea pigs using the Buehler technique.

CLASSIFICATION: Acceptable.
TOX. CATEGORY: N/A

MATERIALS: Hoe 17411 of ZD99 0009 (carbendazim) was the test material. It was described as a white powder and had a purity of 99.4%. The test compound was 50% carbendazim in petrolatum. The test animals were female Pirbright-White guinea pigs, approximately 10 weeks of age and weighing approximately 300 grams.

METHODS: Animals were individually housed in an environment that allowed for a 12 hour light/dark cycle. Food and water were available ad libitum. Animals were acclimated for a period of 5

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days During which they were identified. They were assigned to one of the following designated test groups:

Group	Number of animals
Preliminary	9
Control	10
Treated	20

Prior to conducting the the main dermal sensitization study, a preliminary screening study was conducted to select the maximum quantity of the test material that would produce minimal irritation. Fifty percent, 17% and 5% concentrations of the test material in petrolatum were applied to the left flanks of the test animals (3 guinea pigs/concentration). The test material was applied three times during the course of a single week and held in contact with the skin for 6 hours. Twenty-four hours after each application, the treated area was examined for erythema and edema according to the method of Draize. No skin reactions were reported with the 50% concentration and based on these results, this dose was selected as the induction and challenge dose.

Prior to receiving induction doses, hair was removed from the left flank of each animal to allow for a depilated area. The test material was placed beneath a 2 X 2 cellulose patch and the treated flanks were wrapped to secure the patch. Animals were exposed for approximately 6 hours, after which, all wrappings were removed. Observations for skin reactions were made 24 hours following each treatment. Induction procedures were followed on days 1, 3, 5, 8, 10, 12, 15, 18 and 19. The 10 control animals received 0.5 g of petrolatum on the same days.

On day 37 of the study, the animals in both groups received a challenge dose of 500 mg of the test material in the right flank. The test material was held in contact with the skin for 6 hours, afterwhich, the bandages were removed and remaining test material was wiped away. All animals were evaluated 24 and 48 hours post challenge using the Draize method. Sensitizing properties of a compound were determined based on whether 15% of the treated animals showed a positive response at the same interval that no effects are observed in control animals.

Animals were weighed on days 0 and 39 of the study.

QUALITY ASSURANCE:

A Quality Assurance Statement and a statement of compliance with Good Laboratory Practices were included in the submission.

RESULTS:

No signs of dermal irritation or sensitization were present in the treated animals that approached a level greater than 15% of the number naive controls showing a positive reaction. At the 48 hour evaluation period, only one animal in the treated group exhibited edema which was characterized as barely perceptible. The test material was not considered to be a sensitizing agent based on these results.

DISCUSSION:

Based on the results of this study, the test material was not a sensitizing agent. The study is acceptable and satisfies the guideline requirements for a dermal sensitization study (81-6).

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Reviewed by: Melba S. Morrow, D.V.M. 7/19/94
Section II, Tox. Branch I (H7509C)
Secondary Reviewer: Joycelyn E. Stewart, Ph.D. 7/21/94
Section II, Tox. Branch I (H7509C)

DATA EVALUATION REPORT

STUDY TYPE: Acute Dermal Toxicity Study

GUIDELINE #: 81-2

TOX. CHEM. #: 079C

MRID #: 431296-09

TEST MATERIAL: Carbendazim powder (99%)

SYNONYMS: BCM, LX1132-01

STUDY NUMBERS: 6275-89

SPONSOR: Riedel de Haen
Seelze 1, Germany

TESTING FACILITY: Stillmeadow, Inc.
Sugar Land, Texas

TITLE OF REPORT: Acute Dermal Toxicity Study in Rabbits

AUTHORS: Janice Kuhn, Ph.D.

REPORT ISSUED: July 27, 1989

CONCLUSIONS: Based on the results of this study, the dermal LD50 for Carbendazim was > 2020 mg/kg when administered to New Zealand White rabbits.

CLASSIFICATION: Acceptable
TOX. CATEGORY: III

MATERIALS: The test material was carbendazim powder moistened with saline at a rate of 1.7 ml/kg and the test animals were 5 male and 5 female young adult New Zealand White rabbits, weighing from 2.5 to 3.2 kilograms.

METHODS: Animals were acclimated for 1 week prior to dosing. Their dorsal surfaces were shaved to remove hair and to expose at least 10% of their body surface area. The test material was applied at a total dose of 2020 mg/kg and gauze was placed on the treated area to keep the test material in contact with skin. The gauze was held in place by an adhesive bandage and the entire trunk was wrapped to prevent ingestion of the test material. All wrappings were removed after 24 hours and the exposed area was

washed with tap water and the remaining test material was wiped away.

Animals were observed for signs of toxicity at 1/2, 3 and 6 hours post-dosing and at least once daily thereafter up to day 14. Body weights were recorded on days 0, 7 and 14 and gross necropsies were performed at the termination of the stuyd on day 14.

QUALITY ASSURANCE: Statements of Quality Assurance and compliance with Good Laboratory Practices were included in the submission.

RESULTS: No deaths were reported during the course of the study. The only clinical observation was the presence of diarrhea in both males and females which persisted in the latter sex until day 11. Other animals that did not have periods of diarrhea, were reported to have decreased defecation and /or small feces. The only gross finding was the presence of diarrhea in one female on day 14. There were no treatment related effects on body weight or weight gain.

DISCUSSION: Based on the results of this study, Carbendazim (25%) meets the criteria for Tox category IV. The LD50 for dermal toxicity was greater than 2020 mg/kg. The study is acceptable and satisfies the requirement for an acute dermal toxicity study, in accordance with section 81-2 of the Subdivision F Guidelines.

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Reviewed by: Melba S. Morrow, D.V.M. MSM 7/12/94
Section II, Tox. Branch I (H7509C)
Secondary Reviewer: Joycelyn E. Stewart, Ph.D. JES 7/14/94
Section II, Tox. Branch I (H7509C)

DATA EVALUATION REPORT

STUDY TYPE: Primary Eye Irritation Study

GUIDELINE #: 81-4

TOX. CHEM. #: 079C

MRID #: 431296-11

TEST MATERIAL: BCM (99%)

SYNONYMS: Carbendazim, LX1132-01, Methyl Benzimidazole Carbamate

STUDY NUMBERS: 6276-89

SPONSOR: Riedel de Haen
Seelze 1, Germany

TESTING FACILITY: Stillmeadow, Inc.
Sugar Land, Texas

TITLE OF REPORT: Primary Eye Irritation Study in Rabbits

AUTHORS: Janice Kuhn, Ph.D.

REPORT ISSUED: July 19, 1989

CONCLUSIONS: Based on the results of this study, BCM caused mild eye irritation which subsided 48 hours post- instillation.

CLASSIFICATION: Acceptable
TOX. CATEGORY: III

MATERIALS: Nine (6M, 3F) New Zealand white rabbits were the test animals. BCM, 99% a.i., was the test material. Animals were young adults; their body weights were not provided.

METHODS: After completing a 1 week acclimation period, the eyes of each rabbit were examined with and without flourescein dye to determine corneal damage. Only animals without ocular defects were used in the study.

Undiluted test material (1) mg) was placed into the conjunctival sac of the left eye and th lids were held together for 1 second. The treated eyes of three ales were washed with water 30 seconds after instillation. The aining 6/9 rabbits had treated eyes that were left unwashed. n each of the rabbits, the right eyes

served as controls.

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All treated eyes were examined and graded for irritation at 1, 24, 48 and 72 hours. Corneas were re-examined at 24 hours using flourescein dye and any animals showing evidence of staining were re-examined at the next observation interval until corneal damage was no longer apparent.

Irritation was scored and graded for the cornea, iris and conjunctiva. (See Appendix I). These grades were used to rate the irritating pontential of the test material (See Appendix II for scale).

QUALITY ASSURANCE: Statements of Quality Assurance and compliance with Good Laboratory Practices were included in the submission.

RESULTS: In the 6 animals that were not washed following the administration of the test material, the only apparent signs of irritation were grade 1 conjunctival redness (6/6), grade 1 chemosis (6/6) and grade 1 discharge (3/6). All of these observations subsided in 3/6 animals by the 24 hour observation period and in the remaining 3/6 by the 48 hour interval. In all animals there were traces of test material in the conjunctival sac.

In the 3 animals with the treated eyes that were washed, grade 1 conjunctival irritation was present. This observation was not apparent at 24 hours in 2/3 affected animals nor at 48 hours in the remaining animal.

DISCUSSION: Based on the results of this study, BCM caused mild ocular irritation which subsided by 48 hours. The compound meets the criteria for Tox category III and the study is acceptable.

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RABBIT EYE IRRITATION
Grading Scale

I. Cornea

A. Opacity - degree (area most dense taken for reading)

No opacity.....0
Slight dulling of normal luster.....+
Scattered or diffuse areas of opacity (other than slight dulling of normal luster), details of iris clearly visible.....1
Easily discernible translucent areas, details of iris slightly obscured.....2
Nacreous areas, no details of iris visible, size of pupil barely discernible.....3
Complete corneal opacity, iris not discernible.....4

B. Area of cornea involved

One quarter (or less), but not zero.....1
Greater than one quarter, but less than half.....2
Greater than half, but less than three quarters.....3
Greater than three quarters, up to whole area.....4

C. Fluorescein Staining - appearance of yellow-green staining of cornea

Cornea not examined with fluorescein.....-
No fluorescein staining.....0
Positive fluorescein staining.....P
Area of cornea involved
One quarter (or less), but not zero.....A
Greater than one quarter, but less than half.....B
Greater than half, but less than three quarters.....C
Greater than three quarters, up to whole area.....D

D. Stippling - appearance of pinpoint roughening

No stippling.....0
Presence of stippling.....S
Area of cornea involved
One quarter (or less), but not zero.....A
Greater than one quarter, but less than half.....B
Greater than half, but less than three quarters.....C
Greater than three quarters, up to whole area.....D

A X B X 5 Total Maximum = 80

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RABBIT EYE IRRITATION
Grading Scale

II. Iris
A. Grades
Normal.....0
Markedly deepened folds, congestion, swelling, moderate circumcorneal injection (any of these or combination thereof), iris still reacting to light (sluggish reaction is positive).....1
No reaction to light, hemorrhage, gross destruction (any or all of these).....2

A X 5 Total Maximum = 10

III. Conjunctivae
A. Redness (refers to palpebral and bulbar conjunctivae excluding cornea and iris)
Vessels normal.....0
Some vessels definitely injected.....1
Diffuse, crimson red, individual vessels not easily discernible....2
Diffuse beefy red.....3

B. Chemosis
No swelling.....0
Any swelling above normal (includes nictitating membrane).....1
Obvious swelling with partial eversion of lids.....2
Swelling with lids about half closed.....3
Swelling with lids more than half closed.....4

C. Discharge
No discharge.....0
Any amount different from normal (does not include small amounts observed in inner canthus of normal rabbits.).....1
Discharge with moistening of the lids and hairs adjacent to lids...2
Discharge with moistening of the lids and hairs, and considerable area around the eye.....3

D. Necrosis or Ulceration of the palpebral and bulbar conjunctivae or nictitating membrane
No necrosis or ulceration.....0
Presence of necrosis or ulceration.....1

(A + B + C) X 2 Total Maximum = 20

The total score for the eye is the sum of all scores obtained for the cornea, iris, and conjunctivae with the possible maximum total score for the eye being equal to 110.

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RABBIT EYE IRRITATION
Rating of Test Material Based on Eye Irritation

Rating	Maximum Average Score	Definition
Non-Irritating	0.0-0.5	To maintain this category, all scores at the 24-hour reading must be zero; otherwise, increase category one level.
Practically Non-Irritating	Greater than 0.5-2.5	To maintain this category, all scores at the 24-hour reading must be zero; otherwise, increase category one level.
Minimally Irritating	Greater than 2.5-15.0	To maintain this category, all scores at the 72-hour reading must be zero; otherwise, increase category one level.
Mildly Irritating	Greater than 15.0-25.0	To maintain this category, scores at the 7-day reading must be zero; otherwise, increase category one level.
Moderately Irritating	Greater than 25.0-50.0	To maintain this category, scores at the 7-day reading must be less than or equal to 10 for 60% or more of the animals. Also, the 7-day mean score must be less than or equal to 20. If the 7-day mean score is less than or equal to 20, but less than 60% of the animals show scores less than 10, then no animal among those showing scores greater than 10 can exceed a score of 30 if category is to be maintained; otherwise, increase category one level.
Severely Irritating	Greater than 50.0-80.0	To maintain this category, scores at the 7-day reading must be less than or equal to 30 for 60% or more of the animals. Also, the 7-day mean score must be less than or equal to 40. If the 7-day mean score is less than or equal to 40, but less than 60% of the animals show scores less than or equal to 30, then no animal among those showing scores greater than 30 can exceed a score of 60 if category is to be maintained; otherwise, increase category one level.
Extremely Irritating	Greater than 80.0-110.0	

NOTE: The category of the test material is not to be increased more than one level above its maximum average score.

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Reviewed by: Melba S. Morrow, D.V.M. 7/12/94
Section II, Tox. Branch I (H7509C)
Secondary Reviewer: Joycelyn E. Stewart, Ph.D. 7/26/94
Section II, Tox. Branch I (H7509C)

DATA EVALUATION REPORT

STUDY TYPE: Primary Dermal Irritation Study

GUIDELINE #: 81-5

TOX. CHEM. #: 079C

MRID #: 431296-12

TEST MATERIAL: BCM Technical (99%)

SYNONYMS: Carbendazim, LX1132-01, Methyl Benzimidazole Carbamate

STUDY NUMBERS: 6277-89

SPONSOR: Riedel de Haen
Seelze 1, Germany

TESTING FACILITY: Stillmeadow, Inc.
Sugar Land, Texas

TITLE OF REPORT: Primary Dermal Irritation Study in Rabbits

AUTHORS: Janice Kuhn, Ph.D.

REPORT ISSUED: July 25, 1989

CONCLUSIONS: Based on the results of this study, BCM caused mild dermal irritation which was present at the 1 hour observation interval. The maximum irritation score in this study was 0.3 which was recorded at the aforementioned observation period.

CLASSIFICATION: Acceptable
TOX. CATEGORY: III

MATERIALS: Six (3M, 3F) New Zealand white rabbits were the test animals. BCM, purity 99%, was the test material. Animals were young adults; their body weights were not provided.

METHODS: After completing a 1 week acclimation period, the dorsal trunks of each animal were clipped to remove hair over an 8 x 8 cm area. Five hundred milligrams of the test material were moistened with 0.4 ml of saline. The test material was applied to the exposed skin under a gauze and the test site was covered. The trunks of each animal were wrapped with a semipermeable dressing which was left in place for 4 hours. Four hours

following the administration of the test material, the wrappings and bandaged were removed and the test areas were wiped to remove residual test material. Test sites were observed for erythema, edema, eschar and other dermal effects at 1, 24, 48 and 72 hours following the removal of the wraps and the cleansing of the test site. A scale (attached) was used to score dermal reactions.

Irritation scores were determined by adding the erythema and edema values and dividing the sum by the number of animals observed. The maximum irritation score was derived from the highest irritation score that was present and this score was used to give the test material a descriptive rating.

QUALITY ASSURANCE: Statements of Quality Assurance and compliance with Good Laboratory Practices were included in the submission.

RESULTS: Erythema and edema were both present in 1/6 rabbits at 1 hour following the removal of the wrapping. A maximum irritation score of 0.3 was recorded at the 1 hour interval. All other irritation scores were zero.

DISCUSSION: Based on the results of this study, BCM causes minimal dermal irritation and is classified as Tox category III. The study is acceptable.

RABBIT SKIN IRRITATION
Evaluation of Skin Reactions
Test Material: LX1132-01

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Erythema and Eschar Formation	Value
No erythema	0
Very slight erythema (barely perceptible)	1
Well-defined erythema	2
Moderate to severe erythema	3
Severe erythema (beet redness) to slight eschar formation (injuries in depth)	4
Maximum Possible	4

Edema Formation	Value
No edema	0
Very slight edema (barely perceptible)	1
Slight edema (edges of area well defined by definite raising)	2
Moderate edema (raised approximately 1 mm)	3
Severe edema (raised more than 1 mm and extending beyond the area of exposure)	4
Maximum Possible	4

Other Observations	
No other signs of dermal irritation or defects	0

RABBIT SKIN IRRITATION
Classification of Test Material Based on the Maximum Irritation Score

Descriptive Rating	Maximum Irritation Score	Remarks
Practically Not an Irritant	0.0-0.4	
Slight Irritant	0.5-3.0	
Moderate Irritant	3.1-5.0	
Severe Irritant	5.1-7.0	Severe erythema or edema without tissue destruction.
Corrosive	7.1-8.0	Tissue destruction into the dermis and/or scarring.

END